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(54) AIR TREATMENT HOOD

(71) We, G. BAUKNECHT GESELLSCHAFT MIT BESCHANKTER HAFTUNG, ELEKTROTECHNISCHE FABRIKEN, a German Company of Heidenklinge 2-22, 7, Stuttgart 1, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an air treatment hood for treating air passing therethrough. Such hoods are generally arranged over kitchen ranges or the like preferably against or in wall cupboards of kitchens, and have a housing with an air inlet in the underside.

It is known to provide an air treatment hood with a filter unit which comprises a grease filter and a steam filter one above the other in an air-permeable covering. The grease filter serves principally to remove grease particles. The primary task of the steam filter is to act as a smell filter, i.e. to free the air which is passing through smells. A disadvantage of such a combined filter unit is that it cannot normally be cleaned or reactivated without destroying one of the filters. In addition, the two filters have differing saturation times. Furthermore, difficulties are involved in constructing air treatment hoods which are matched in respect of their external measurements to kitchen wall cupboards in such a way that they can operate effectively.

The present invention aims to provide an improved air treatment hood having a particularly advantageous arrangement and design of filters, while taking into account the differing opportunities for grease and steam filters for reactivation, cleaning or renewal, in such a way that particularly favourable conditions result from an economic and technical point of view.

According to the present invention, there is provided an air treatment hood comprising a housing with an air inlet in its underside, an air outlet in an upper region, and an air path from the air inlet to the air outlet; a frame mounted for movement with respect to the housing between inserted and withdrawn positions; a first grease filter provided in the frame and disposed in the air path at the air inlet; a second grease filter mounted in the housing in the air path adjacent to the air inlet and not movable out of the housing with the frame, the arrangement being such that in the inserted position of the frame one grease filter overlies the other, and on withdrawal of the frame the area of the inlet and the total effective grease filter area exposed to air entering the inlet increase; and mounting means in the air path downstream of the grease filters and adapted to receive a removable steam or smell filter.

In a preferred arrangement the invention provides an air treatment hood for treating air passing therethrough, comprising a hood body or housing having a lateral opening and a bottom opening; a frame displaceable through the lateral opening from an inserted position in which the frame closes the lateral opening and is fully inserted into the hood body, to a withdrawn position in which the frame is partially extracted from the hood body; an air path in the hood body arranged to convey air from the bottom opening to an upper part of the lateral opening, whereby the air passing through the hood is discharged from the said upper part when the frame is in the withdrawn position; a baffle plate carried by the frame and arranged to deflect towards the air path air entering the hood through the lateral opening; a first grease filter attached to the

frame and a second grease filter attached to the hood body for filtering the air passing through the hood so that as the frame is moved from the inserted to withdrawn positions the first grease filter is moved relative to the second grease filter to increase the filtering surface area; and mounting means in the hood body adapted to receive a removable steam or smell filter to filter the air downstream of the grease filters.

In such a hood large filter surfaces can be provided in a structurally simple manner with given external size so that intensive filtering of the air is achieved at relatively low flow resistances and the filters need to be cleaned, renewed or reactivated only at relatively long intervals. The air treatment hood according to the invention has a space-saving, simple and cheaply manufactured design which facilitates effective removal by suction and filtering of the air rising from a kitchen range or the like and containing cooking, roasting or similar fumes.

By pulling out the movable frame it is possible to increase the width of the air inlet of the hood with the result that this width can be modified to suit the requirements of the moment.

If the grease filters and steam or smell filter (if any) are designed and inserted as separate filters it is possible to clean, reactivate or renew the filters independently of each other, which procedure has economic and technical advantages.

In addition, when designing the grease filters it is no longer necessary to take into account that they should be able to withstand the high temperatures to which the steam or smell filter, which expediently contains activated carbon or similar smell-removing substances, is exposed when it is heated (in order to reactivate it), for example in an oven, to approximately 250°C. In addition, the hood is structurally simple, reliable in operation, cheap to manufacture. The filters may be arranged in a particularly favourable manner and the air inlet of the hood may be increased by pulling out the frame. Moreover, the grease filters may be separately cleaned with lyes which would render the steam or smell filter unusable.

A further advantage of separating the grease filters from the steam or smell filter is that the size of the filters may be different and, if desired, relatively large filter surfaces can be provided so that small flow resistances result and the filters need to be cleaned, reactivated or renewed only at fairly lengthy intervals.

In a preferred embodiment of the invention the grease filter surface extends both over the inlet aperture on the underside of the movable frame and also over at least part of the external side of the frame, the external side of the frame being designed in such a way that air may flow in through at least one part of this external side through the grease filter and into the air passage.

The steam or smell filter may expediently be housed at a distance above an air inlet in the underside of the movable frame. In the housing of the hood a stationary intermediate partition wall is located at a distance below the housing upper wall or roof and an air passage is thus formed through which the filtered air may be conveyed preferably by means of an air conveying device housed inside the hood, the steam or smell filter covering this air passage.

The air inlet at the bottom of the air treatment hood is as large as possible when the movable frame is in a withdrawn position, whereas, when the movable frame is inserted, the second grease filter lies on the first grease filter and when the frame is in a withdrawn position the second grease filter covers the area of the air inlet aperture at the bottom of the hood which is exposed by the first grease filter.

The hood may expediently have an approximately square shape when the movable frame is in its inserted position. The outer dimensions are preferably configurated in such a way that the hood may be incorporated into a kitchen furniture fitting, preferably incorporated into a wall cupboard in a kitchen or attached next to such a wall cupboard.

The hood may have an air conveying device located inside the housing. However, when an air conveying device is not provided, the hood is placed in communication with a chimney.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:—

Figure 1 is a diagrammatic representation of a cross-section through an air treatment hood according to the present invention, a movable frame being located in a fully inserted or closed position;

Figure 2 shows the hood according to Figure 1, but in this case the movable frame is in an intermediate position between its fully inserted and its fully withdrawn position;

Figure 3 show the hood according to Figure 1, the movable frame being in its completely withdrawn position and a flap hood arranged against the movable frame being rotated outward at an angle in order to further increase the intake range of the hood.

With reference to the Figures 1 to 3, a

hood 13' is shown incorporated into the underside of a wall cupboard 11 (shown in dot-dash line). Two stationary side walls, such as 14, of this hood are formed by side walls of the wall cupboard 11. The hood 13' has a square outer configuration and is provided with a movable frame 34' which is shown in its fully inserted position in Figure 1. The horizontal width of the hood measured parallel to the plane of the drawing may be, for example, approximately 30-40 cm and its length perpendicular to the plane of the drawing may, for example, be approximately 55-95 cm. Other sizes are, of course, possible. The hood 13' comprises a stationary housing or hood body 9 having in addition to the two side walls, such as 14, which are parallel to the plane of the drawing, a base 31, a rear wall 15 and an upper wall or roof 17. Side walls 14, rear walls 15 and roof 17 are flat and impermeable to air. The base 31 which is also flat has a rectangular air inlet aperture or bottom opening 35' which extends virtually over the length of the base from the front side of the base to the edge 55 of the base located in the vicinity of the rear wall 15. On both sides of this air inlet aperture 35' there are narrow flange-like areas of the base which are not shown and on which the movable frame 34' may slide in a guided manner.

As shown in Figure 1, the frame 34' closes a lateral opening of the housing 9 and extends into the housing so that the end of the frame inside the housing reaches the side wall of the housing opposite to the lateral opening. The frame 34' is guided in the manner of a drawer in the stationary housing and may be withdrawn into the position shown in Figure 3 in which an upwardly bent edge 57 of an air outlet grid 41 covering the air outlet 42 comes to rest against a stop member 59 housed on the inside of the roof 17.

The movable frame 34' has an angle baffle plate 36 which extends over its length. The horizontal area 36' of the baffle plate 36 forms part of the roof of an air inlet 24 and, when the movable frame 34' is withdrawn, forms an extension of a stationary intermediate partition wall 19 housed in the housing. The frame 34' also has side walls, such as 60, extending over its height in order to provide lateral boundaries in the completely or partially withdrawn position for the air inlet 24 and an air outlet 25 in those parts of the side wall which are no longer limited by the side walls 14 of the stationary housing 9.

The rectangular front side of the frame 34' and its similarly rectangular underside are completely covered by a first grease filter 50 which is bent to form a right angle. The filter 50 extends over the length of the frame and is constituted in known manner by a mat 63 of fabric or the like, for example, plastics material, glass or other fibres, threads or the like, the mat being laid against an outer grid 62 which is bent to form a right angle and being secured in any suitable way in the applied position, for example by means of a grid or the like applied to its rear. The grease filter 50 is fixed releasably in the frame 34' so that it may be removed from the frame 34' for cleaning or renewal.

Preferably the upper part of the vertical surface of the grease filter 50 lies tight against the front side of the vertical extension of the angle baffle plate 36.

At the upper end of the external side of the frame 34' a flap hood 33' is pivotable about an axis 40. In the position shown in Figure 1, the front wall 67 of the flap hood 33' completely covers the external or front side of the movable frame 34' and extends parallel to this external side. The front wall 67 of the flap hood 33' matches the appearance of the wall cupboard 11 in the position shown in Figure 1. The flap hood 33' may be pivoted manually into a position shown in Figure 2 or 3, into which its front wall 67 is directed at an angle outwards from the axis of rotation 40 downwards and outwards, thus increasing the air intake range of the hood 13'. The flap hood 33' may be mounted so as to remain automatically in any position to which it is set by hand. If desired, however, it may also be housed so as to be held in the open position by means of a catch, locking member or the like. This flap hood 33' has side walls, such as 39, which are flat and have the shape of a quadrant section. These side walls provide lateral boundaries for air intake.

In the stationary intermediate partition wall 19 of the housing there is a circular aperture 20 into which the motor of an air conveying device 21 protrudes concentrically, its impeller wheel being numbered 22 (Figure 1). The impeller wheel 22 overlaps an annular collar 69 of this aperture 20. A duct section 70 is attached underneath this annular collar 69, its upstream end having a rectangular cross-section and being arranged to locate a steam or smell filter 52. The steam or smell filter 52 is releasably fixed to an extension of the wall 19 and completely covers the inlet aperture of an air duct formed by parts 69, 70 with the result that all the air flowing into this duct must flow through the activated carbon filter 52. The carbon filter 52 includes activated carbons. There is freedom of design in order to configurate the dimensions of the activated carbon filter 52 in the most favourable manner in the light of the given economic and tech-

nical considerations. The activated carbon filter 52 is square or rectangular in the embodiment shown in the drawings. However, it may also have a circular or any other shape if this is desired, the inlet of the air duct needing to be modified to the desired configuration.

The activated carbon filter 52 may be removed from the hood 13', if the grease filter 50 has been removed beforehand. Filter 52 may then be reactivated for example by means of heating or exchanged for a new activated carbon filter.

In order to provide as large as possible a grease filter surface there is a second rectangular grease filter 51 provided in addition to the first grease filter 50. Filter 51 extends over a length of the bottom opening 35' and its horizontal width, measured parallel to the plane of the drawing, corresponds approximately to the length of the straight path of motion of the mobile frame 34'. This second grease filter 51 is movably housed against a web 73 by means of hooks 72 arranged on its rear and passing through slots in the vertical stationary web 73, this web 73 being designed as a bent portion of the base plate 31 of housing 9. This arrangement facilitates not only free adjustment movements of the grease filter 51 (Figure 2) both transverse and parallel to the direction in which the air flows through as shown in Figures 1 and 3.

The front longitudinal edge of the grease filter 51 adjacent to the filter 50 is bevelled in the manner shown. In the same way the rear longitudinal edge of the first grease filter 50 is bevelled in such a way that the first grease filter 50 may be displaced under the second grease filter 51 and raise the latter when the mobile frame 34' is pushed back from a withdrawn position (see Figure 2 or 3) into the housing 9. When the mobile frame 34' is in the fully inserted position the second grease filter 51 lies on the first grease filter 50 parallel thereto. When the mobile frame 34' is withdrawn into the position shown in Figure 3 the two bevelled edges of the first and second grease filters 50, 51 lie against each other with the result that the second grease filter 51 then forms an extension of the first grease filter 50 and the result is a very large total grease filter surface area.

The second grease filter 51 is also housed in an easily releasable manner with the result that it may be removed. To this end the slots of web 73 through which hooks 72 pass may be open at the top.

When the hood 13' is needed to filter air arising from a position where cooking or roasting or the like is taking place, the movable frame 34' is withdrawn partially or completely, depending upon requirements, and depending upon requirements again the flap hood 33' is rotated from its vertical position into an inclined position in which air also flows through the front air inlet aperture 79 of the frame 34' which is covered by the vertical grease filter range or extension, with the result that the width of the air inlet aperture of the hood 13' may be increased by each of these measures. This air inlet aperture 79 extends approximately half way up frame 34' and permits air to be conveyed to the air path inside the hood 13'.

When the air treatment hood 13' is no longer needed to filter air, movable frame 34' is pushed into the position shown in Figure 1 and flap hood 33' is closed.

As a variation of the embodiment shown in the drawings, it is also possible to make provision to the effect that when the movable frame 34' is in the fully inserted position the solid upper part of the external side of the frame has one or more air outlet apertures or slots with the result that the air treatment hood can then be operated in this position also. However, it is generally more favourable if, when the movable frame is in the fully inserted position, the air outlet is closed so that there is no unnecessary throughput of air when the apparatus is not being used. On the other hand when the frame is pulled out, even if only to a small extent, there will be an adequate air outlet available between the external side of the frame and the housing. A switch for starting the air conveyor device could be made operable upon pulling out the mobile frame.

WHAT WE CLAIM IS:—

1. An air treatment hood comprising a housing with an air inlet in its underside, an air outlet in an upper region, and an air path from the air inlet to the air outlet; a frame mounted for movement with respect to the housing between inserted and withdrawn positions; a first grease filter provided in the frame and disposed in the air path at the air inlet; a second grease filter mounted in the housing in the air path adjacent to the air inlet and not movable out of the housing with the frame, the arrangement being such that in the inserted position of the frame one grease filter overlies the other, and on withdrawal of the frame the area of the inlet and the total effective grease filter area exposed to air entering the inlet increase; and mounting means in the air path downstream of the grease filters and adapted to receive a removable steam or smell filter.

2. An air treatment hood for treating air passing therethrough, comprising a hood body or housing having a lateral opening and a bottom opening; a frame

displaceable through the lateral opening from an inserted position in which the frame closes the lateral opening and is fully inserted into the hood body, to a withdrawn position in which the frame is partially extracted from the hood body; an air path in the hood body arranged to convey air from the bottom opening to an upper part of the lateral opening, whereby the air passing through the hood is discharged from the said upper part when the frame is in the withdrawn position; a baffle plate carried by the frame and arranged to deflect towards the air path air entering the hood through the lateral opening; a first grease filter attached to the frame and a second grease filter attached to the hood body for filtering the air passing through the hood so that as the frame is moved from the inserted to withdrawn positions the first grease filter is moved relative to the second grease filter to increase the filtering surface area; and mounting means in the hood body adapted to receive a removable steam or smell filter to filter the air downstream of the grease filters.

3. A hood as claimed in Claim 2, wherein the frame has an external side located adjacent to the baffle plate and arranged to close the lateral opening of the housing, when the frame is in its inserted position.

4. A hood as claimed in Claim 3, wherein an upper part of the external side of the frame is solid, whereas a lower part thereof comprises an extension of the first grease filter, thereby allowing air to flow into the housing through the lateral opening.

5. A hood as claimed in Claim 4, wherein the solid part of the external side of the frame is constituted by an extension of the baffle plate.

6. A hood as claimed in Claim 4 or 5, wherein the solid part of the frame is formed with at least one slit.

7. A hood as claimed in any one of Claims 2 to 6, further comprising a flap hood pivotably mounted to an external side of frame and arranged to cover the said external side in a position in which it rests against the external side and to be directed at an angle outwards from the external side in an extended position thereof thereby increasing the air inlet range of the hood.

8. A hood as claimed in any preceding claim, wherein the first and second grease filters are removably mounted in the hood.

9. A hood as claimed in any preceding claim, further comprising a steam or smell filter removably mounted in the mounting means downstream of the grease filters.

10. A hood as claimed in Claim 9, wherein the steam or smell filter comprises activated carbon.

11. A hood as claimed in any of the preceding claims, wherein the second grease filter at least partially overlaps the first grease filter when the frame is in its inserted position.

12. A hood as claimed in Claim 11, wherein the second grease filter lies on the first grease filter when the frame is in its inserted position.

13. A hood as claimed in Claim 12, wherein the first and second grease filters have adjacent edges formed with bevels so that when the frame is displaced from a withdrawn position to its inserted position the second grease filter is raised by the first grease filter and the first grease filter is moved underneath the second grease filter.

14. A hood as claimed in any of the preceding claims, wherein the frame is movable to a fully withdrawn position where the first and second grease filters are arranged adjacent to one another.

15. A hood as claimed in any of the preceding claims, wherein the steam or smell filter mounting means is located at a distance from the grease filters in the air path.

16. A hood as claimed in any of the preceding claims, wherein the air path in the hood is delimited by a stationary partition wall in the housing or hood body.

17. A hood as claimed in Claim 16, wherein the partition wall forms an air duct.

18. A hood as claimed in Claim 17, wherein the air duct is tapered in the downstream direction along at least a portion thereof.

19. A hood as claimed in Claim 17 or 18, wherein the steam or smell filter mounting means is located upstream of the air duct.

20. A hood as claimed in any of the preceding claims, further comprising an air conveying device located in the air path within the housing.

21. A hood as claimed in Claim 20, wherein the steam or smell filter mounting means is arranged upstream of the conveying device.

22. An air treatment hood for treating air passing therethrough substantially as herein described with reference to the accompanying drawings.

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1 SHEET

COMPLETE SPECIFICATION

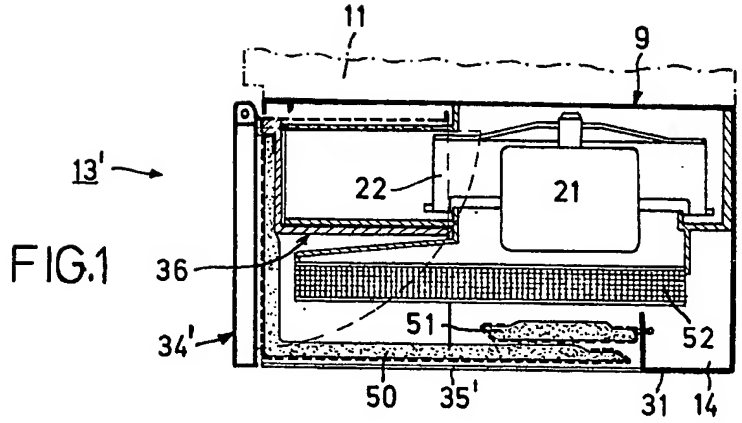

FIG.1

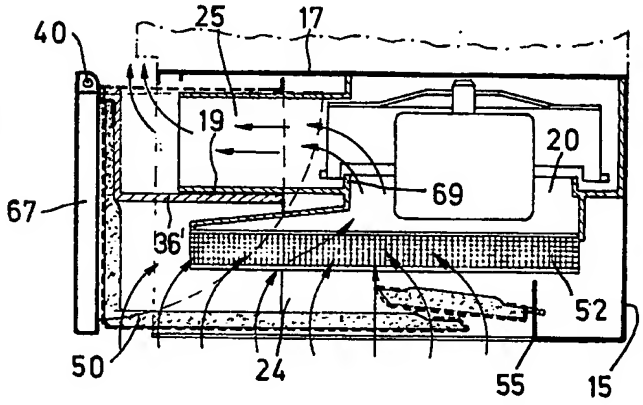

FIG.2

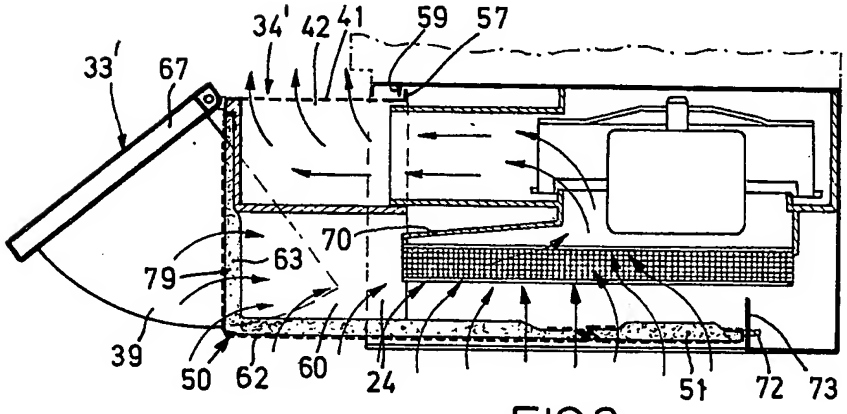

FIG.3